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THE NATURE AND METHOD OF SCIENCE, WITH THOUGHTS ON TEACHING SCIENCE.

(The opening address of Rev. A. L. Chapin, D. D., before the joint session of the Wisconsin Teachers' Association and the Wisconsin Academy of Sciences, Letters, and Arts, in the Assembly Chamber at Madison, Wis., Dec. 29, 1879.)

I desire to present concisely and clearly some characteristics of genuine science, inherent in its nature and processes. The field before us is immense, but my purpose is to follow a direct course in traversing it, snatching illustrations, wherever, along the way, I can best pluck a fact or group things in their proper connections.

It is said, "A full, accurate, and accepted definition of science has not yet been produced." The statement is no doubt true. Perhaps, it is impossible to frame such a definition, simply because this, like some other very significant terms, is better understood without such a definition than it could be with it. Singularly, the writer just quoted, in the very same sentence accepts with satisfaction this definition recently framed by Professor Fowler, of Oxford, viz: "Science is the filiation of causes through common observation to things beyond." I frankly confess that though I easily catch a distinct meaning of these words, my mind is not much helped by it, and I suspect it was so with you all as you heard them. Yet without a technical definition, I think we can in another way get a clear and trustworthy apprehension of the nature of science.

Let us start then with this truth which stands in the consciousness of every one of us, that we are endowed by our Creator with intelli-

gent souls. No theory of evolution which controverts this truth is yet, or is likely to be, established. Add to this, that our dwelling-place is appointed in a world wonderfully adapted to engage the soul's powers and develop its capacities. Surrounded everywhere by objects which are fit material to employ the mind, human thought goes out naturally to employ itself in the various work of observation and reflection, abstraction and generalization, comparison and deduction. The result of any one of these processes is knowledge. That compact, systematized whole which is the product of all these processes, combined in the discharge each of its own office is *science*. Suppose we say then, *science is knowledge systematized*. This is not a definition. It is rather a simple translation of the word. It brings to view the two first essentials of science — a *knowing mind* in contact with *things that may be known*.

Let us consider these two points more particularly, taking up first the material of science, and second, the processes of the mind by which it is wrought into order and system.

Knowledge is the perception of truth. Truth, then, is the material of science. But what is truth? We are answered, "truth is the reality of things." This tells us only where truth is lodged and whence it proceeds. Perhaps this is as near as we can come to the essence of truth. Its place is in things that are. It is simply the reality of their being. Its source is — where else can it be? — with Him from whom all things that are have their being. All realities apprehensible by us are but emanations direct or indirect, immediate or remote from Him who is the only absolute, independent reality, God, the "I am that I am." Every fact gained in our study of material nature is the expression of a thought. I break a rounded pebble taken from a bank of drift; and lo! it is a geode, filled with sparkling crystals of amethyst. Those uniform lines and angles which shape each six-sided prism and its pyramidal terminus embody mathematical thoughts. The rich color flashed and reflected from these surfaces combines with the pleasing forms to express thoughts of beauty. What is my study of this object but an attempt to read another's thoughts? *Whose* thoughts am I reading? As we pass into the realms of *organic* being, such thoughts multiply before us in myriad forms, grouped in harmonious relations with a thread of manifest design running through. *Whose* plan, whose purpose is here revealed? Is such a thing as independent, original thought possible to the human mind? Is it not the fullest development of intellectual

power, the highest attainment of the understanding in man, to catch the thoughts of God, through his chosen media of expression,— to think over singly and collectively the wonderful thoughts of God? And must not science, or any department of science, when it attempts to disjoin truth from its divine source, be imperfect, unbalanced, delusive, false?

I do not wish, however, to press this point further in our discussion. In view of tendencies manifest in certain quarters nowadays, I could not do less in passing than to give this full and distinct recognition of man's kinship with the intelligent Creator of the universe, and of the thoughts of God as the substratum of all genuine science. Let it give dignity and sacredness to our ideas of science, that it does resolve itself, in its ultimate and essential element, into a knowledge of God. Let this view lead us, by every line of reseach after truth on which we may enter, to trace it to its true beginning and end.

Advancing now, on the line of our discussion, it is to be observed that truth, as lodged in things that are, appears in two phases. It is embodied in the *properties* of things and in *processes* of action and change which belong to them. All truth is simple fact of one or the other of these two kinds. In one or the other of these forms, truth lies everywhere, around us and within us. All our knowledge of anything is confined or reducible to facts of one or both of these forms. Yonder tree, as it stands before you in the inaction of its winter repose, embodies a little world of truth. You may study its whole and its parts, its external appearance and its internal organism, its size and shape and color, its trunk and roots and branches, its bark and wood and sap, its rings and arteries and fibre, and thus you will learn its many curious properties, and gain truth concerning its being. The sunny days of spring will shortly come. Then, under the genial warmth of the new season, action and change will begin to pass upon the tree, and another little world of truth will present itself. The buds will swell, the leaves will expand, the tender shoots will put put forth and grow; the blossoms will open, display their beauty, exhale their fragrance, and drop to the ground; the fruit will take form, dilate itself, and ripen, producing within itself a germ for the generation of its kind. Now you have truth pertaining to the processes of nature in the tree. If, by close investigation, you trace the connection between the properties and the processes, lo! like the globules of quicksilver with which children, wondering, sometimes play, your two little worlds of truth are suddenly lost in one, and

the one is larger than the two, for that the changes have revealed new properties, and, working by these, other and more hidden processes are seen.

I have in hand a book of science, replete with truth. It brings before my mind realities which I never have seen and probably never shall see for myself. It tells me of the stars of heaven, what and how great they are, and how they shine and rolling move in constant order along their immense orbits through perpetual cycles. It sets forth objects, grand, almost above my conception; motions swift and vast, which I can hardly apprehend; relations intricate and strange, quite beyond my comprehension. Thirty years ago, the science of astronomy was thought to be about complete. But keener observation, with telescopes of greater power, has discovered new worlds and started new problems; and a new instrument, the spectroscope, has given an insight into the properties of matter and its changes in those distant worlds, which intensifies curiosity and investigation in that department of knowledge beyond anything known before. What that system, developed by such an incalculable expenditure of human thought in the past, is hereafter to grow to, no man can tell. Yet, the material of this great system, on which such labor of the human mind has been and is to be expended, is simply properties and processes, matter and its changes. If the book gives me knowledge of its sublime subject, it lies in my mind as simple facts in these two forms, which determine relations, settle general principles, and establish universal laws.

There is another branch of knowledge, which contemplates *mankind*, in their social organization. It is the science of government. Its results come before us chiefly in dry abstractions, general principles, concise but comprehensive constitutions and codes of laws, long drawn out in hard technicalities of language. But here, too, the material of the science is simple facts concerning the social nature and actions of men. Its storehouse is the history of the world, whose records are made up of the ever changing forms and revolutions of human society. Its value as a branch of science is proportioned to its conformity with the facts of men's nature, and the interplay of relations and forces in the organizations and functions of a State.

Again, that mental activity which puts forth its efforts in the world of outward phenomena, with the intent to systematize the mind's knowledge of things that are there, opens another world

within the mind itself. In due time it returns from its rambles abroad to inquire into the properties of this thing within, to which it has been ministering; asks what it is that knows, what the process of knowing, what are the capacities employed, and what their modes of action. Here, also, the whole material for thought to work upon consists of facts respecting the nature of mind and changes in the mental state. It is a material, spiritual, intangible, invisible, yet to the man of reflection more real than that which is drawn from other sources, because furnished by his own consciousness. This material, wrought into systematized knowledge, presents a product, metaphysical, abstract, profound; but the essence of this deep philosophy is still the reality of things that are, and that happen in the mind.

One thing more in this category must be noticed. There is a book which purports to be an authoritative communication of moral truth from God. Without raising here the question of its authenticity, we may take it, expecting to find material for a moral science. We are not disappointed, and, from the structure and contents of this book, it is evident that the material of this, like that of all other departments of science, is simple fact respecting properties or attributes of the beings whom it concerns, and their actions. The Bible is not a systematic treatise on moral science, but only a storehouse of the material out of which that science is to be wrought. In this respect there is a beautiful and striking analogy between the book of Scripture and the book of universal nature. If it be God who has written truth upon nature that it may come within the cognizance of man, and become the material of science, the mode in which truth is presented in this book of language addressed to the understanding of men, so corresponds with the method of nature as to establish a probability, at least, that it is indeed a communication from God. However this may be, if anything worthy the name of moral science is possible, its material, from whatever source derived, must be still only facts of being, or of action and change.

From this glance at some of the divisions of human science, it appears that the Father of the human mind has provided for the employment of its faculties, if I may be allowed the expression, only *raw* material. But we need not complain, for this is furnished in richest profusion and in endless variety. Substances of divers and curious forms lie all around us; we meet them at every turn, and they have almost a voice to invite the soul to look, inquire, and know them. Events throng before us and seem either to deck themselves with en-

ticements to win, or to take on an aspect of authority and terror to command our attention and study. To him who with ready will and earnest zeal goes forth, with busy powers, to work on this material, the toil becomes a pleasure, than which earth yields none higher. As fact after fact is gathered, and spun into threads of connected relations, and woven into the fabric of certain knowledge, the soul rejoices in every step of its work, and labors on with ever growing enthusiasm. Though the warp runs on into the bosom of immensity, with no apparent end, yet each crossing thread added to the woof, makes a finished part, and the labor is not spent in vain.

Let us pass on to consider next the process by which the simple facts with which the world is stocked are gathered, strung in their true relations and systematized into science. That process begins with *observation*, the first and simplest exercise of the mind. The five bodily senses are so many channels through which the intelligent soul runs out to connect itself in a more or less intimate acquaintance with the whole world of matter. In the exercise of observation, its powers first wake to action and begin to acquire knowledge; and by the same exercise it may lay hold of all that material of science which lies embodied in the properties and changes of things outside of itself. The greatest philosopher of nature gathers the substance of his profoundest thoughts and most extended investigations by the simple operations of seeing, hearing, smelling, tasting, and feeling, the same by which the infant gets its first little ideas of things. Is not this truth a beautiful illustration of the grandeur of simplicity which marks the constitution of the human mind, God's noblest workmanship? Through these open windows the soul looks out and takes cognizance of things as they exist, and of events as they happen. It notes and takes into its treasury those which it will use, and then retires to arrange and combine them as truth demands.

An intelligent lady in London, being called on by one of the Fellows of the Royal Society, told him, as an item of news, that a person had come to reside in the next house, who she judged was a poor, mad gentleman, because she said, "He diverts himself in the oddest way imaginable. Every morning, when the sun shines brightly, he takes his seat on a little stool before a tub of soap-suds and occupies himself for hours blowing soap bubbles through a common clay pipe, watching them intently as they float about until they burst. He is doubtless now at his favorite amusement; do come and look at him." The visitor followed her smiling, and when his eye rested on the person

so engaged, he replied, "My dear madam, this man whom you suppose to be a poor lunatic, is no other than the distinguished Sir Isaac Newton. He is observing the refraction of light upon thin plates, a phenomenon which is beautifully exhibited on the surface of a common soap bubble." Such is the place that observation, the commonest of all mental exercises, holds in the structure of science.

But observation has to do only with the outside world of things. We have seen that there is another world of truth pertaining to the inner properties and operations of the mind itself. Observation sets the wheels of this interior mechanism in motion, but it brings no report of its structure and functions. Through the nerves of sense as channels, streams of truth are ever flowing into the mind, but the current runs always one way; nothing is returned by these channels. To gain knowledge of realities in that inner sea into which all other truth is poured, we must follow the stream, and by that exercise called *reflection*, note the attributes and action of the mind itself. Reflection is to the facts of mind what observation is to the facts of matter. Each is a distinct exercise by which facts are apprehended, and the elements of knowledge are gathered.

But it is not every kind of observation and reflection which contributes to the composition of genuine science. You may see a thoughtless boy as eager in blowing soap bubbles as the great philosopher. He will watch them as intently as they float away and break. They may seem to be doing the same thing; and the good lady may not discern a difference between the acts of the man and those of the boy. Hence her natural inference that the grown up philosopher has either foolishly neglected to put away childish things when he became a man, or has insanely returned to them. But while the apparent work or play, as you may please to term it, is the same, the mind's exercises in the two cases are quite different. The boy takes but a vague, superficial glance at his bubble, noting only its symmetrical form, its bright and changing color, its light and airy motion; or, at furthest, he adds a little fancy to trace resemblances in the pictured shapes and colors, and make believe the bubble is a world filled with pretty little trees and men and houses and cities. The philosopher looks, too, only on the surface, but his perceptive faculty is strained up with a fixed and earnest purpose to watch every line and change of color, and to read the characters traced and obliterated again in the instant, in which God writes out one of his grand, univeral laws. To define the difference minutely would carry us too

far away into the depths of mental philosophy. It is enough now to apprehend that scientific observation implies more than the passive reception of impressions from external objects, more than a cursory examination for amusement of things whose novelty engages curiosity,— and that scientific reflection is something more than the quiet revery of a vacant hour, or the aimless speculation of the mind on occasions when wit is keen and fancy bright. These first exercises in the working of truth into science, are characterized by steadiness of attention, ingenuousness of inquiry, and thoroughness of investigation.

But these exercises, however intently applied, are but first steps in the process. By them facts are accumulated, but they lie like the mass of shapeless ore just brought from the mine, unconnected and unarranged, altogether useless, till reduced by other operations. To fill the mind with miscellaneous facts, or to write books full of them, does not make science. The soul will not grow, mankind will not thrive by being stuffed with food, unless there is provision for its assimilation. We note, therefore, as the next step in the process, the mental exercises of abstraction and generalization, by which the observed properties and actions of individual things are separated, selected, and combined so as to define general properties and principles. These are ties of connection with which hundreds and thousands of individual facts are grouped together as bound by common laws. Then truth, as defined in the general statement of principles, though expressed in few words, sweeps a wide range. Knowing these principles, I know something of an immense variety of objects. Under this process, the heterogeneous mass of material, gathered by observation and reflection, moves off to range itself in rank and file and company and regiment and battalion; each fact takes its proper place, and all stand subject to the beck of the human intellect, which has thus brought them into order. Or to change the figure, myriads of individual facts are disposed in comparatively few concentric circles which gird the one great sphere of truth.

For illustration, turn again to the tree just noticed. I first observe the facts which pertain to it as an individual. Then I extend my observation to other trees, and note many of the same facts concerning some of them. I abstract and hold the common properties, and drop the rest, and thus have a circle of trees of one species, say the oak. I further canvass the mass of facts before me, and dropping the peculiar qualities of the species, I hold a smaller number of properties,

but sweep a larger circle, that includes all trees of every kind. Again I drop some of these, or rather abstract and hold a portion, and by them describe a yet larger circle, which embraces all vegetables. Thus I may go on, until abstracting the four simple properties, extension and figure, divisibility and solidity, which pertain to the tree, and making these the basis of my classification, I have a circle large enough to embrace every kind of matter.

The workers in all departments of science are carrying on this process of abstraction and generalization. The chemist, with his acids and blow-pipe and microscope, is pushing to the last extreme his analysis of substances, that he may tell where each belongs. The geologist is trying thus to classify facts respecting rocks and minerals and fossils and earths, that he may give each its time, as well as place, and make up a history of æons past. The astronomer is doing the same thing among the facts which his telescope brings to view, of orbs and their movements in the heavens. The mathematician takes the facts of number and quantity out from all objects with which they are identified, and by abstraction and generalization defines formulas to be used as rules and measures for all things. And the metaphysician comes in and makes the interior mental operations, which are busying all the rest, the special subject of his investigation, that he may work out a science of sciences.

When this classification has gone a little way in the arrangement of facts already observed, it has the effect to shape and direct the further processes of observation. Facts are studied with respect to principles and relations. Newton sits down to watch the changes of light playing on the surface of his bubbles, that he may test and further define principles, indicated by previous observation. Kepler mounts up and moves among the stars, trying on his geometrical figures to see how they fit the facts which meet him there. So everywhere, scientific experimentation, no longer done at hap-hazard, is directed by preconceived purposes and plans. Then when from any quarter a new fact is brought forward, the first thing done is to find its place and relations, to see under what general principle it comes, whose subject it is, and where it will serve any good purpose towards rounding out the sphere of human science. When its place is found and its law defined, then is it known; till then, it is a homeless wanderer, frowned on and kicked about everywhere, as a kind of illegitimate thing without kindred. After being thus abused for a time, it may establish its legitimacy, and then this process of generalization,

which before commanded its exclusion, introduces it with honor to its place among the truths; whole families are set at once to correct their genealogies, and some false and presumptuous pretenders are cast out and consigned to eternal disgrace. Such was at first the contempt put upon the theory of Copernicus, and on Harvey's facts concerning the circulation of the blood, and such was their ultimate vindication and triumph. The importance of this process warrants the statement which one has made, that "the power of accurate generalization is the true index by which the extent of our knowledge is measured."

Intimately associated with this process, so intimately, often, as to be identical in time and actual operation, is another whose office is yet distinct. It is comparison and deduction; or, as it is fitly termed, the process of *reasoning*. This is the highest effort of the mind in framing science, all essential to the completeness of the work, and yet involving some danger to the certainty of results, and to the harmony of different sciences with each other, because the line between sound reasoning and sophistical speculation is not very clearly drawn, and plausible guesses are easily substituted for ascertained facts, and ingenious theories have a fascination which blinds many minds to their illusive character, and the enthusiast in one branch of science is prone to insist that his own methods and conclusions shall be applied to all problems. We need to remember that the exercises of comparison and deduction must be suited to the different materials of different departments of research, and that each department has its own limitations, which must be regarded. With all this in mind, we may say, the specific office of reasoning in the construction of science is, first, to bind together the results of the other processes we have noticed, in a consistent, well-compacted system, and then to project inquiry forward from this substantial base in the bold enterprise of adventurous discovery, systematically conducted, that the terra firma of truth known may be ever enlarged by steady and safe encroachments upon the sea of the unknown.

Let me present a few illustrations. Traversing the open field, you come upon a single disjointed bone, an individual thing, without apparent connection with aught else. But in one department of science it has its place and character defined, and one, trained in comparison and deduction as applied to such objects, will tell you at a glance the limb of which it is a part, the animal to which it belonged, and its entire race and genealogy, for it is already bound up by invari-

able laws of connection with a section of natural history well known. Thus, by the process of reasoning, all things are swept into place and relations, and nothing is permitted to exist by itself and for itself.

Again, the bright sun at noonday suddenly goes out in darkness, and the breasts of savage men are stricken with a horror of great fear. But by the calculations of scientific reasoning, the phenomenon has been understood and announced beforehand to civilized people. They watch the eclipse with interest and delight, as a demonstration of the certainty with which the intricate complexity of movement among the orbs of heaven has been traced, defined, and made plain as the trodden ways of men on earth. A century ago, Franklin conceived that the sparks and sharp reports drawn from his electrical machine and Leyden jar, were akin to the lightning's flash and the thunder's roar. Then, by a course of comparison and deduction made through observations instituted with this design, he settled the question, brought the lightning down, showed the world what it is, and opened the way for the subjection of that force of nature once so terrible, to the service of man. One day, some three hundred years ago, a youth in an Italian church, listless of the service, was watching the long swing of a lamp suspended from the roof. It was Galileo, beginning then and there that train of thought and close reasoning which, followed up by various experiments, established the laws of the pendulum, defined a rule for the uniformly accelerated velocities of falling bodies, gave a mathematical formula for the universal action of the earth on all bodies at its surface, and made mechanical philosophy a new science.

Nearly a hundred years later, another young student, driven from his college by the plague, is reclining under a tree amid the calm quiet of country scenes. Suddenly, a falling fruit brings to mind those laws of Galileo, and starts another far-reaching train of reasoning. May it not be that the principle which here urges all bodies towards the center of earth, gives law to the moon's revolution, and guides the courses of the more distant planets, and rules all matter in the universe? The thought possesses his mind, and he works intently on the calculations which will confirm his theory; but there is an error in the accepted measurement of the earth's radius, one of his most important data, and the first result is unsatisfactory. Sixteen years pass on, and then, with corrected data, he takes up again the problem, and lo! in the last arithmetical operation it stands out proven that "an attractive force emanating from a center, and acting inversely as the

squares of the distances, must produce motions exactly resembling the motions of the planets, both in regard to the form of the orbit and the velocity of the body at each point." The law of gravitation is established. The whole distance between the swing of that hanging lamp, the motion of that falling apple, and the revolving movement of worlds in fixed orbits on the unmarked fields of boundless space, is bridged by a concatenation of mighty reasoning, in which, through the processes of comparison and deduction, the framework is so fitted and joined together, that the immense structure stands self-supporting on the immovable pillars of eternal truth, and the whole world of matter is encircled and bound by one universal law. Such is the province of reasoning in bringing facts into system, and so framing science. From the illustration, we get some idea of both the vastness of its structures, and the power of the human mind to search out the deep thoughts of God.

Our notice of the processes involved in systematizing knowledge will be incomplete without some reference to the labor spent on the instruments with which the processes spoken of are carried on, and the casings in which the results are finally set. For all objects observed, the mind demands names which may stand before it ever as the representatives of things, properties, and changes perceived. Reflection, too, needs language in order to bring forth and shape the results of its labor. The processes of abstraction and generalization can hardly go on at all without instruments of the same kind. We can hardly conceive of reasoning as possible without this means of shaping and connecting thoughts. And even if systems of science could be framed and held in the minds of those who first discover and arrange truth without this medium, how could they be communicated to others? How could they be preserved as permanent accumulations of intellectual wealth to make mankind always rich, except in *forms of language?* On the fit preparation of this instrument, therefore, much depends. So a new field is opened before us for a distinct department of science — the science of language — which is most intimately connected with every branch of knowledge. But I may not linger here even for a single illustration. Enough for the present, if we recognize its place and importance among the intellectual exercises concerned in the development of thorough science. A proper study of language is a training in each and all of the exercises referred to in this discussion.

Let me now sum up in concise categorical statement the points I have tried to define and illustrate.

1. The *substantial element* of science is absolute truth, so far as the human mind can grasp it.

2. The *source* of scientific truth is universal nature, and all Divine revelation, the exponent of God's thoughts and ways.

3. The scientific *method* is classification and arrangement, defined by fixed laws and general principles; each several department of science having peculiarities of method, suited to the nature of its own materials.

4. The *presentation* of science is ever in formulas of language which show both the materials and the processes of its structure.

5. The *beneficent end* of science is the advancement of mankind in knowledge and happiness; for it sets the ladder by which the human soul reverently climbs up towards its great Original and approximates, though still at a vast remove below, the height of that infinite understanding to which truth is one absolute whole, the universe of beings and events being apprehended as in one great, present, blessed thought, all aglow with light and love.

Will your patience still bear with me a little, while I state a few corollaries from our main propositions?

1. Genuine science is one whole, composed, indeed, of parts, diverse and complex, yet all harmonious and accordant. Truth cannot be at war with truth. One branch of science cannot properly conflict with another. Whenever there is seeming collision, it is due either to some imperfection of understanding, or to some admixture of error on one side or the other. This thought should make us slow to take up novelties at variance with accepted truth; slow to affirm inconsistency between conclusions sustained by clear demonstration; slow to denounce anything as absurd or impossible on mere a priori presumption, and at the same time, bold in the confidence that under free inquiry, truth will maintain its purity and integrity against the wild vagaries and assumptions of false pretenders.

2. True science is in its very nature *progressive*. The human mind will never complete its work in the elaboration of science. Thus far in its progress, every discovery made has laid open new fields for investigation, and every demonstration made of a law of nature or of a universal principle of truth, has suggested new propositions to be projected, tested, and, if it may be, proved by further investigation and reasoning. This thought should keep us free from bigoted attachment to our own cherished opinions as though they comprehended all truth. It should hold us in an expectant state, looking for more light, anx-

ious rather to be wise by truth accepted, than to prove ourselvss wise by closing the avenues to new truth. It should inspire us with an enthusiasm of hope in our own researches after truth, of joy in the achievement of others, of triumph in the overthrow of our own and all errors.

3. True science is also, in its very nature, *conservative*. Its material and its processes produce in the mind convictions not to be shaken by any conceit that springs from a source less substantial than its own basis. Every fact or theory that claims her recognition must prove its legitimacy as the result of clear-eyed observation and sound reasoning. Each new comer, however fair in appearance or specious in pretension, must stand without till satisfactorily tested. Only the visionary schemer or the quack is impatient at this delay. The real philosopher, like Kepler, finishes his work and gives it to the world, content that men should take their own time, though it be centuries, to prove its qualities. He who offers us matter worthy of our acceptance, has a confidence in its verity which lifts him above all fretful impatience at the slow reception of his discovery. Against the conclusions of science the fanaticism of the visionary, the noisy declamation of the pretender, and the furious zeal of the hobby-rider avail nothing. A mind balanced in the love and in the apprehension of the truth will not admit the new statement that the sun is a living creature, with wings and legs and eyes, all in motion, until the telescope has been taken to pieces and, at least, a search made for the fly on the object glass. We may, then, well be slow to follow him who insists that his new idea is to upheave the foundations and revolutionize the system of established truth.

4. Genuine science is also from its nature, *practical*. It brings the mind into an acquaintance with things and their relations, and this knowledge is always power to use these things in their relations. There is not a principle of truth established which has not hidden in it a blessing for the world through some application. Herein it is clear that they who devote their energies to scientific pursuits are rendering important service to mankind. Though they deal much in dry facts and abstract principles, their labors yield precious fruits all along the ways of practical life.

5. The power of an individual mind for any achievement is measured by its capacity for accurate observation, steady reflection, nice analysis, proper generalization, careful comparison, and sound judgment,—the processes of science. In proportion as a mind is habitu-

ated to these exercises, though its store of knowledge is small, it is secured against imposition and false philosophy, is balanced in the truth, and is charged with the forces of intellectual life and progress. By these exercises, it enters the domains of knowledge and traverses them not at hap-hazard but by rule. By these it makes discoveries for itself, and by these makes its own the discoveries of other minds.

In this connection, it is fit that something be said about teaching science. There is no time for a full unfolding of the topic; I can offer only a few bold propositions without expansion or illustration:

1. A real knowledge of science is impossible except through the same mental exercises by which science is framed and increased.

2. Every mind must learn to systematize knowledge for itself. Facts are not knowledge until apprehended in their relations.

3. The different branches of science give different degrees of prominence to the several mental processes which have been mentioned, one requiring most of observation, another most of analysis and classification, another most of deep and complex reasoning.

4. Nevertheless, a mind well trained in all these processes is the better fitted for either specific exercise. One trained to accurate observation is thereby prepared to reason correctly; and the skillful analyst and sound reasoner best know how to search and examine all things in their relations.

5. Education is strictly nothing else but drawing out the faculties of young minds in just these scientific exercises. Teaching a child his letters involves them all.

6. That education is one-sided and imperfect which does not give scope and training to all these processes.

7. All true teaching is therefore dealing with the germs of science.

8. The place to begin teaching science is in the primary school, or rather in the nursery with the child's first efforts at perception.

9. The excellence of a teacher is measured most of all by his ability to engage the minds of his pupils with interest and enthusiasm in just these scientific processes, whatever be the particular subject of the lesson. Nothing proves it better than the way in which he manages a reading class.

10. When the work of teaching deals with a specific branch of science proper, then the only way is to put the tools and materials into the scholar's hand, to work out the science for himself, with only hints from the teacher to guide him. It is not teaching to pass the conclusions of science into a receptive mind as you would pour water

into a cup. No student learns geometry by committing the demonstrations to memory, nor chemistry by reciting the formulas of various compounds, nor geology by hearing about rocks in the lecture room. The busy hand in the field and on the mountains, the open eye in the laboratory, the clear head putting the lines and angles of the diagram into relations thus and thus apprehended and defined, the introverted thought, busy with the curious working of the mind itself—only these and such as these exercises make a master in any branch of science.

Brother and sister teachers, such must be the style of our work. The right of private judgement in all matters involving truth is now the acknowledged right of all men. The possession of the right lays on all the obligation to prepare themselves for its fit and free excercise. There is no range of knowledge so high, no course of action so grand that the mind trained to the processes of true science, may not pass judgment on its merits, though its mysteries may be too deep for his full grasp. They who would attain, or who would help their fellowmen to attain, the freedom and independence of true manliness, must task themselves to the discipline which will make them, in respect to all things, accurate observers, careful analysts, sound reasoners. So will science find in every mind a home, and false pretension and imposition will be banished to the haunts of darkness, where souls languish and die.

The time was when philosphy had her esoteric presentation for her few initiated disciples, while the exoteric garb in which alone she appeared to the common view of the public was intended to overawe the vulgar mind by a veil of mystery behind which it had no leave to look. The time has been when all learning was shut up in cloistered cells of monks and holy clerks, who assumed to do the study and thinking of the world, and pronounced their judgments, with the high claim that the world should receive them all without question, on the sole ground of their infallible authority. But those times have passed away. Philosphy has broken the bars of her former seclusion, and walks forth in her own native strength and grace, courting the acquaintance and confidence of all, that she may bless all alike, knowing none as favorites except those who draw most largely from her open fountains of truth. Learning has now no exclusive home, gives to none exclusive privileges, recognizes no rank or station as conferring peculiar title to her stores. She opens wide her domains and invites all to enter, demanding only this that they who range

her fields shall respect her character, follow her methods, keep in harmony with one another, and freely give the world the benefit of that which they may freely gather.

PRIMARY INSTRUCTION.

GIFTS AND OCCUPATIONS OF THE KINDERGARTEN.

The gifts and occupations, so called, of the kindergarten, numbering twenty in all, will readily be seen by the explanation of their uses.

The six little worsted balls, the three primary and three secondary colors, form the first and prettiest gift of all, which have been baby's playthings in the nursery, and are also used in the kindergarten. These little playfellows which to baby's growing consciousness have been the whole world and everything in it, are capable of so many uses that they are never outgrown, and no prettier games can be invented than those with the ball. Frœbel's methods of presenting these different gifts and occupations to the child are drawn from a psychological study of the various avenues of mental impressions through the senses; these always made clearer and more lasting through the law of contrast. Frœbel learned also, what we all know, that the child's mental impressions to be helpful must be pleasant and oft-repeated. So, beginning with the colored balls, which combine symmetry of form, beauty and harmony of color, in the hands of an intelligent nurse, who should be the mother, the little one has added the laws of motion, which, in connection with the pretty little ball songs, the harmony is completed by the introduction of rhythmical sound.

The second gift brings a new world to the little one. This consists of the ball cube and cylinder made of wood; so where, with its former playfellows, the balls, the little fingers found an impressible surface, brightly colored, they now have a hard, uncolored one; and where they found a smooth never ending surface in the ball, they have a contrast in the cylinder, and a still greater one when they are brought in contact with the cube. Without time to elaborate this idea, it seems plain enough already.

The third gift brings back the little inch cube, with seven others just like it, forming together a divisible cube; and although these are given to the children as playthings, in a playful manner, and they,

following the dictation of their head workman, build pretty chairs, and sofas, and tables, for papa and mamma, shops to work in, and houses to live in, carriages and trains of cars to ride in, they will not fail to learn that these are *cubes*, that they have six surfaces, eight corners, twelve edges, that there are two halves, four quarters, and eight eighths in every one, although these things are mentioned incidentally, and not as a lesson in mathematics.

The fourth gift is a cube formed from eight oblongs, each one containing a cubic inch. With these added playthings contrasted with their cubes, they are not long in finding out that each brick, as we call them, contains just as much as a cube, only in a different form.

The fifth and sixth gifts multiply these forms, and divisions, and subdivisions, of each, and though, as I said before, these gifts are all presented to the children in play, and *do* suggest *such* wonderful inventions, such stories, such dear little confidences, yet this play-work, in the hands of a skillful kindergartner, may, and will, lay the foundation of a thorough, systematic, mathematical and artistic education.

The seventh gift brings still another contrast. In the preceding ones the child deals with solids; in this, with surfaces. The square inch, the obtuse angle, the equilateral, isosceles, and scalene triangles, cut from light wood, and prettily colored, comprise this gift, and a source of endless invention is it. Like a kaleidoscope does the artistic taste of the little ones bring out new forms of beauty. These forms, like those made with the blocks, form copies for drawing, and, in answer to dictation from the kindergartner, the little hands work out the most abstruse geometrical problems. No abstractions are these, although leading directly to abstract reasoning. No definitions are needed. Incidentally, as in everything else, the names of these are mentioned and principles are learned, never to be forgotten, for they are a part of *things* themselves. And this was Frœbel's theory, that *knowing* is *doing*, and through *doing* alone comes knowledge.

The eighth gift, like most of the previous gifts, is designed to teach numerical proportions and forms. It consists of thin wooden sticks, cut in different lengths, from which figures, letters, forms of beauty, life, and knowledge can be made, and also used for drawing.

The eleventh gift is perforating or pricking, one of the most fascinating of gifts. Instead of drawing the invented or dictated design, it is pricked at regular distances with very pretty result.

The twelfth gift brings embroidery, the crowning glory of all the

little inventor's work, for in it he sees the finished, perfect result of all his previous efforts.

The thirteenth number is cutting and pasting. Squares or triangles of paper are folded according to certain rules, then marked by dictation, and then, with a little pair of scissors in each right hand, the folded paper in the left, and the corner of each little mouth twisted, ready to *chew*, the order "*cut*" is delightfully obeyed. And out of these scraps, which are always mathematical in shape, the ever recurring form of beauty is designed, and, with a little brush and dish of mucilage, is pasted upon paper, and the almost perfect accuracy and neatness with which this is done is sometimes truly wonderful. In a class of twenty children between the ages of five and seven, from one cut seventeen different designs were pasted, showing originality and independence quite surprising.

The fourteenth gift is weaving, which furnishes room for inventive talent to a very great extent. In this, too, the fundamental principles of arithmetic are thoroughly learned, and in this, as in most of the other gifts, both hands are used alike.

The use of the wood slats or splints from which the picture frames so common are made, is the fifteenth gift, and furnishes the transition from surface to line. These are laid and interlaced in geometrical and fancy figures.

Intertwining folded paper according to certain rules into similar forms comes next.

Folding, the eighteenth gift, is as prolific, if not more so, in practical results as any. The square, rectagle and triangle are the elementary forms from which an endless variety of shapes are folded. In this occupation the principles of geometry are taught in the most practical manner, and the result is always one of beauty. Eight hundred entirely different forms have been folded by one person.

In the nineteenth gift we have the peas work, which is very successful in developing the eye for perspective drawing.

The gift numbered twentieth is modeling, the one for which the little ones always anxiously wait. The little square board with its lump of potter's clay is always the signal of irrepressible expressions of joy. And twenty or thirty of these strange dishes sitting before as many expectant, eager little children, whose fingers are just aching for the signal to begin work, is a sight which once seen, will never be forgotten. And in this gift more than in any other the child, with its busy little hands brought in contact with the tender, yielding

material, its first and last mother, while working out in ever so crude a way some expression of the thought within it, comes to a half consciousness, perhaps for the first time, that "this is *I*, and through this new-born power working in me, *I am a creator*." Would that every mother in the land when she holds in her arms her first child could feel in all its significance such consciousness. As fully as I can at this time I have noticed the varied work of the kindergarten, but let no one understand that these are to be given in the order named. The manner and order of presenting them is a special study in itself, and young children are never allowed to play more than twenty or twenty-five minutes with any one gift. — MRS. F. A. B. DUNNING, *Kenosha, Wis.*

PRIMER CLASSES.

One of the questions at the spring examination was, "How will you conduct the primer class?" Nine-tenths of the applicants for certificates dodged the question — that is, they did not attempt to answer it.

It seems easy enough to teach a primer class, and yet it is the place where most teachers fail. The reason is that teachers cannot, or do not, get down to a child's level. We must unbend in changing from an algebra to a primer class. Long words and abstract ideas won't do with those little ones, and hence it is that some young girls are doing better work than many of our older and more learned teachers. The person who cannot get down and talk about dogs, cats, sleds, dolls, dolls' dresses, or any other of a child's pets or playthings, is a dead failure as a teacher of children. And mind you, the talk must be *earnest*. It won't do to *pretend* that you are interested. No room for hypocrisy here. The child knows in an instant whether or not the teacher is in earnest. We were in a school a few days since where it was a pleasure to listen to the primer scholars. They all wanted to talk at once. They crowded up to the teacher with flashing eyes and eager faces. The little fingers were snapping in spite of themselves. They pulled the lesson in pieces in less than no time. They all had something to tell about it. Toward the close of the lesson they all *did* talk at once, and there was nothing disorderly about it either.

In the next school, the teacher talked to the primer class about a horse as learnedly as if she were describing the Corliss engine. The

little ones looked at her with one eye shut, as much as to say, "you don't like boys and girls." To teach a child, you must be a child.

"Backward, turn backward, O, Time, in thy flight;
Make me a child again, just for to-night."

— SUPT. D. A. MAHONEY, *in the Kenosha Telegraph.*

THE almost universal custom of a whole class of school-children thrusting out their hands, snapping their fingers, and resolving themselves into a mob at every mistake in reading and recitation, would be tolerated nowhere in a civilized community outside a school-room. No better expedient could be devised to frighten the timid, exasperate the quick-tempered, and paralyze the spirit of all but the stoutest-hearted child in the recitation-room. It stimulates the critical spirit into the public nuisance of an intolerable carping at all human infirmities. But it is utterly opposed to the true spirit of the school-room, which ought to be a spirit of helpfulness, forbearance and encouragement to the slow and timid and feeble-minded. There are surely good ways enough of holding the attention of a class, or correcting the errors of a recitation, without tolerating a habit so disagreeable to the looker-on and so destructive of good manners and Christian courtesy among children.

SELECTED.

COMPULSORY EDUCATION.

[The question having been asked of the Chicago *Inter-Ocean* as to the extent of compulsory education in this country, the following answer was given:]

Maine, New Hampshire, Massachusetts, Connecticut, New Jersey. New York, Ohio, Michigan, Texas, Wyoming, Nevada, California and Wisconsin have laws designed to produce this result; but in many cases they are comparatively inoperative. In Maine the towns are permitted to adopt by-laws providing that persons between the ages of six and seventeen years shall attend school twenty weeks in the year. These laws are in force in a large portion of the state, and, it is said, with good results. In New Hampshire, all those between eight and fourteen, and living within two miles of a school, are by

law required to attend school twelve weeks in the year. In Massachusetts the limit of age is eight and fourteen, and the number of weeks required twenty. Connecticut claims to have been the originator of the system of compulsory education, and there the law is perhaps more thoroughly enforced than in any other state. The laws of the other states named are similar to those mentioned above. The difficulty in most cases, as in Ohio, seems to be that the laws either cannot be, or, at least, are not enforced. The Hon. G. B. Northrup, of the Connecticut State Board of Education, recently made a visit to Europe to study the system in its practical workings there, and returned well pleased with the results of his observations. In London the enforcement of the system, adopted but a few years since, had already broken up the gangs of juvenile offenders and placed their members in the schools with good results. The authorities report that since its inception the trouble with the younger criminals has become much less, and the books of the Holloway Prison for Juveniles showed that the number sent thither had fallen to about one-sixth of those sent in the years preceding the adoption of the system. The reports from the other nations of Europe where the system is in force are equally in its favor. Germany, Austria, Prussia, all but two cantons of Switzerland, Scotland and portions of Brazil have the system, and the result in most of these has led to a commendation of the system. It is believed by many that in this country the system will be made successful.

A PROBLEM SOLVED.

In St. Louis there is no attempt to bring all classes within the same grade to *one standard* of advancement, so that, in January, all pupils within a given grade shall have arrived at just the same point in a study.

At all times there are new classes just beginning the work of a grade, or year's work, in some one of our schools.

The classes are not separated by intervals of one year in their work, but by irregular intervals, varying from six weeks to twenty. It is considered desirable to have these intervals small, so that reclassification may be more easily managed.

Pupils who fall behind their class for any reason (such as absence, lack of physical strength or of mental ability) may be reclassified with

the next lower class without falling back a year, and thus becoming discouraged.

Pupils who are unusually bright or mature, may be promoted to the class above, or form new classes with the slower pupils of the class above, who need to review their work.

Thus it happens that in a district school there is a continual process going on, the elements of which are as follows:

(1.) The older and more advanced pupils are leaving school for business or other causes. This depletes the classes of the most skillful and best paid teachers, who are usually placed in charge of the most advanced pupils.

Again, there is at all times of the year an influx, into the lower grades, of pupils who have just completed their sixth or seventh year, and are now anxious to commence their school career.

Thus the pupils in the primary rooms of our schools tend continually to be overcrowded. (2.) To correct this continued tendency which overcrowds the rooms of the least skillful and poorest paid teachers, and gives small quotas of pupils to the most skillful and best paid teachers, from time to time (usually once in ten weeks, but oftener in some schools), each class is sifted, and its most promising pupils united with what remains of the next higher class: (i. e., with the not-promising portion of it — those who for absence, or dull intellect, or weak will, fail to keep up with the best).

(3.) To make room for this transfer a portion of the highest class is sent to the Branch High Schools.

(4.) The number changed from class to class is usually small. The disturbance in classes is very slight compared with the advantages gained by the teacher in being relieved of the necessity to drive the laggards, and drill and cram them to make them keep up with the average of the class.

The teacher was once obliged to spend most of her time upon the dull ones, in the useless endeavor to force them to make up lost time, or to equal the strides of the more mature, more regular, or more brilliantly gifted pupils, and, of course, these latter pupils lost proportionately, and the net result of the process was to overwork the incompetent, and to hold back the competent ones.

The teacher, in the vain efforts to hold together the extremes of her class, separating more widely every day till the end of the year, became cross and petulant, and sank continually into the abyss of drill machine pedagogy.

Under our present system we can make room, when needed, in the lower grades, and fill up the classes of our skillful and high priced teachers. — W. T. HARRIS, *City Superintendent of Schools, St. Louis.*

THE AGE AND EXTINCTION OF ANIMALS.

As to animals, the teeming microscopic life of a drop of pond water includes that of creatures which appear to live but for a few hours, while the proverbial *ephemera*, in its winged state, lives but one day, or even less.

On the other hand, a tortoise which died in the Bishop of Peterborough's garden, in 1821, was more than two hundred and twenty years of age, and one belonging to Archbishop Laud died from neglect at the age of one hundred and twenty-eight years. As to fishes, the pike has been said to live for two hundred and sixty-seven years, and the carp for two hundred years.

It is highly probable that the gigantic salamander may live for a greatly prolonged period, and frogs and toads are probably long-lived animals, small as is their relative size. A toad has been kept for thirty-six years without showing signs of age, and then died through an accident. Whales have been supposed to live from three to four hundred years. The life of an elephant is said to extend beyond a hundred years, but of this there seems as yet to be no certain evidence. Birds, as creatures at once so active and warm-blooded (and thus compressing, as it were, much life into a small period), might be expected to be short-lived. Yet parrots have been known to live for upwards of a century, and pelicans, geese, and crows may exceed the period commonly allotted to man. But, however commonly threescore years and ten may be the term of human life, man can certainly both live and retain his intellectual faculties more or less, beyond a hundred years. Yet a horse is generally old at thirty, and is not known ever to have attained twice that age. The life of a sheep is about fifteen years' duration, and that of a dog from fifteen to twenty, although allied animals are much longer lived. Thus, the lion called "Pompey," which died in the Tower of London in 1760, had lived there for no less than seventy years.

Wolves have disappeared from England since the time of Henry VIII., though in Scotland they existed till 1743, and in Ireland till 1766, if not even somewhat later.

But sixty years ago the great bustard wandered about the South Downs and on Salisbury Plain, and we all know how rare many beasts and birds have become which were once common in Great Britain.

In 1741, the illustrious naturalist, Steller, was wrecked on a small island off the coast of Kamtchatka, since called Behring's Island. There he found in enormous numbers an unwieldy aquatic beast, the rhytina, which he took to be the manatee which it closely resembled. Peaceful and harmless, browsing on seed-weed, with dull senses, but with strong feelings of attachment for their mates, these beasts seemed long to have escaped discovery, in spite of the various exploring expeditions which visited Eastern Siberia after it came into the possession of Russia in the latter part of the seventeenth century. This escape was doubtless due to its very restricted range ; for it seems not to have inhabited the mainland of Kamtchatka, or America, or the Kurile Islands, or any other part except the remote and desolate spot where it was discovered, and where doubtless for ages it had held, in undisputed sovereignty, its "ancient solitary reign." Unfortunately for it, it was not only equally incapable of flight or of self-defence, but its unwieldy body proved to be excellent eating. The result was, that such was the havoc made by the crews of trading vessels, that, in only twenty-seven years from the time of its first discovered, the last survivor was killed and the species entirely extirpated. Another example of rapid extirpation by sailors is that of the gigantic and defenceless ground pigeon of Mauritius (without powers of flight), which was called the dodo, and which, till lately, was only known by some old representations, and a solitary head, two feet, and the more or less imperfect skulls. No specimen of the dodo has been known alive since 1681.

The great auk, also now extinct, survived till 1844, and some seventy skins, nine skeletons, a variety of bones, and sixty-five eggs of the bird are now carefully preserved in museums. But the most wholesale and regretable destruction of lately-existing animals is that which the natives of New Zealand have effected. Previously to its human colonization, that island was inhabited by a number of gigantic birds of various (at least four) species, of which group the little apteryx is the sole surviving, diminutive, and more or less remotely allied representative. We are indebted to the skill and patience of Prof. Owen for ideal restoration of these wonderful avian giants, the tallest of which was eleven feet high.

When the Cape of Good Hope was first explored, the common zebra was found in its vicinity. Farther in the interior another kind was subsequently discovered and sent to our collections, where it is valued for its rarity. Now, the common zebra, much the more completely and beautifully striped, is the rare one, and threatens to become extinct, as does the majestic African elephant, if its reckless slaughter for the sake of its tusks is not soon suspended. The American bison, again, must eventually disappear from the earth's surface, unless protected as its congener in Europe — the aurochs — preserved by the Emperor of Russia. — *St. George Mivart, in the Contemporary Review.*

THE ARYAN RACE.

The classifications of the races vary from three to eleven. Our Geographer, Maury, gives us 5; viz: The Caucasian, Mongolian, African, Malayan, and Indian.

The leading race is of course the Caucasian. This is also now the most numerous, there being according to late estimates 564,000,000 of this race, against 535,000,000 of the Mongolian. Caucasians have been taken as the type of this race and have suggested the name. It is said, that many years ago, the famous ethnologist Blumenbach, in classifying skulls, had a single Georgian skull, which he regarded first in his assortment, that of a Greek being next. Hence, this skull was taken as a type of highest division of our species. This is probably an error, at least, this idea has drifited behind the most advanced opinions of our day, and it has been said, that the well shaped skull of this Georgia female, has done a great deal of posthumous mischief, by confusing our ethnology.

Again, Caucasian is objectionable probably, as bringing under one race the Arabs and Germans on the one hand, and on the other hand, as denying the connection of the fair skinned Germans and the swarthy Hindoo, because of difference of color. This action is similar to that of a scientific man, who classifies fruits not according to structure and nature, but according to color, putting red fruits in one one division. Yellow in another; etc. The Caucasian race includes the Aryan, Semitic and the Hamitic divisions.

Aryan division is equivalent to the old Indo-European or Hindoo, Germanic races, and has two great branches of which the Hindoos are types of the one and the Europeans of the other — both probably

modifications of climate. Students of language have long since been convinced, that there is a strong analogy between the Sanscrit of the Hindoos, the Zend of the Persians, Greek, and Romanic (including French, Spanish, Italian, Portuguese). The languages are to the ethnologist what strata are to the geologist, and the dead languages among them are his fossils and petrfaications, by which he is able to *spell out* the ethnical records of the past. By a long and deliberate study of these facts, our untiring modern scholars have naturally gravitated to the conclusion, that the ancestors of the above nations originally dwelt in central or south Western Asia, North of the Hindoo Kosh mountains, near the Sea of Aral. A map in Swinton's outlines, gives the original home of the Aryans

Whence is the name "Aryan" derived? In the old Sanscrit writings the ancient Hindoos called themselves Aryans; Arii is now preserved in the name of a tribe of the Persians. Herat is supposed to be a modification of Arya. By the bye, the word "man" is said to be an Aryan word, meaning to think. It is said that the word Aryan first meant agriculturist, and afterwards respectable, since the most respectable people were agriculturists. These Aryans came across the river Indus, about 2,000 years B. C. There is no doubt of the similarity of these Hindoos and the Persians. Why, up to the time of Darius Hystaspes, they could talk together without an interpreter.

From the above historic cradle of the Aryans, they migrated S. E. to India, or W. to Europe, or S. W. to Asia Minor.

Prof. Bopp, of Berlin, has shown that the European languages are closely related to the Hindoo and Persian. This was not known fifty years ago.

We yield to the Semitic branch the first honor in religious development, since all of the leading systems of religion, namely, the Christian, Jewish, and Mahometan, have sprung from it, but it is the Aryan race which has inherited the blessing of "Increase and multiply," has been the pioneer of progress, and has planted new and great nations all over the earth. Unlike Bishop Berkley's, its "star of Empire" has made its way both eastward and westward.

If we trace back the civilization of modern nations, we go back directly to the Romans. Why, look at the 30 per cent. of Latin words in the English language. The Romans in turn reflected the knowledge of the Greeks, and we have 5 per cent. of Greek words. All of these people were pure Aryans, and there is every reason to believe that the Aryans, whether yonder in Asia or here in America, were worthy of their name.

Here I would say that I do not join in the clamor against the northern hordes that poured in upon and broke down the Roman Empire. The name of "Goths" and "Vandals" means only that they belonged to the unterrified Aryan stock, and we believe that they out-threw the effete Latin race because they were better men, *else they could not have done it.* That the Romans should call them barbarians is natural, just as geographers put down all countries they don't know as unexplored deserts, which daily grow larger and more fertile as they are known.

We close with a statement made by the learned historian, Dr. Francis Lieber in the presence of the writer; that, modern civilization is made up of Grecian intellectuality, Roman law, Christian morality, and Teutonic independence — all pure Aryan principles. — Prof. H. C. MITCHELL, *Atlanta, Ga., quoted in the N. Y. School Journal.*

HOW YOUNG EYES ARE MADE NEAR SIGHTED. — A prolonged and steady looking at an object or objects near the eye, though at proper distance, without rest or frequent change of the visual focus, as in long and absorbed novel reading, intense study or persistent diligence in needle work; the practice of reading or otherwise using the sight at too short range, are causes of near-sightedness. This latter results, in part, from insufficient light; or from its faulty direction, so that the hand or body throws a shadow on the page; or so that the direct rays fall upon the eye, causing undue contraction of the pupil, while the page is in shadow. It results also from improperly graded desks, from small and poor type and inferior printing-ink, and from faulty color and quality of printing papers; also from pale writing ink — pale when used — and from substitution of the lead pencil for the pen, especially in the evening. A prone or forward position of the head too long maintained, or frequently repeated and becoming a habit, is another cause. This results from reading or studying with the books in the lap, and from the use of desks not graded to the height of the pupil. Donders says, "In the hygiene of myopy the very first point is to guard against working in a stooping position." He favors high, sloping desks; and indicates "rectilinear drawing on a flat surface," as a class of work which is especially objectionable. Reading and studying in railroad cars is known to be a fruitful source of injury. Insufficient light, perhaps more than any other cause, produces diseases of the vision. This is not confined to the schools,

Sadly frequent as it is found to be there, it is believed to be yet oftener illustrated at home, both by daylight and in the evening, in preparation for the school and otherwise. Artificial illumination is faulty at best, but, even in the most favored homes, the elder group is apt to monopolize the shaded drop-light or student lamp, while the schoolboy, with his text-books, is found somewhere in the outer circle. — *Popular Science Monthly.*

Arctic Exploration of the Northeast Passage. — Although arctic exploration in the direction of the northwest passage has been a favorite yet comparatively fruitless enterprise for many years, it was not until last year that asuccessful exploration of the northeast passage to Asia was made. Explorations in this direction had for three centuries proved abortive, so that the first successful one was made by the Swedish ship *Vega*, under the command of the energetic explorer, Prof. Nordenskiold. He completed the memorable voyage during the months of July, August, and September of last year — a voyage which Capt. Markham says will always rank as one of the greatest geographical feats of the present century. The commander of the *Vega*, after careful study of currents and movements of ice in these seas, and two test voyages in 1875 and 1876, at length succeeded in making the famous passage from the Atlantic to the Pacific ocean around the northern part of Europe. He also succeeded in opening up the Siberian coast and rivers to civilization and commerce. On the 5th of August last, Prof. Nordenskiold reached the mouth of the Yenisei river, and on the 19th of the same month, the first keel (as Capt. Markham says) made by human hands cleft the sea round the most northern point of the old world." This was Cape Chelyuskin — the *Promontorium Topin* of Pliny — found to be in north latitude, 77° 41′.

Another notable voyage in this direction was made last year by the Dutch schooner *Willem Barents* — so designated in honor of the Dutch navigator of that name in 1594. This schooner succeeded in reaching the hitherto inaccessible shores of Franz Josef Land, lying three degrees north of Novaya Zemblya (or Nova Zembla). The only other vessel which approached the inhospitable coast was the Austro-Hungarian exploring ship, *Tegetthoff*, which drifted there in the ice in 1872–3, in which she was hopelessly beset, and from which she was never extricated, but had to be abandoned by her heroic crew.

The geographical importance of this feat of the *Willem Barents* cannot be too highly estimated, as it has disposed of many knotty points in northeastern Arctic navigation. It is expected that it will greatly facilitate the scientific exploration of the polar sea and area, and thus solve many doubts and surmises of navigators in arctic waters.— *Canada School Journal.*

Prof. Benjamin Pierce, of Harvard College, sent a card to the newspapers, in which he says: "I am fully persuaded that the comet recently discovered by our eminent American astronomer (Dr. Gould) is a return of the wonderful comet of 1843, which has been considered as in many respects 'the most interesting of any on record.' (Cooper's Cometic Orbits.) The first record of this comet is in 1770 before Christ, with an average period of about seven years. The subsequent visible and recorded returns are 370 and 252 and 183 before Christ, and after Christ 386, 422, 533, 582, 708, 729, 882, 1077, 1106, 1208, 1313, 1362, 1382, 1402, 1454, 1491, 1511, 1528, 1668, 1689, 1702, 1843, and 1880."

The Natural Teacher.— Do you know a person who loves to learn, and who has, besides, the gift of explaining his knowledge to others? That person will become a teacher. The common idea has been that any one who possessed book knowledge could teach,— the power to impart was entirely overlooked. John B. Gough is not a learned man, surely, but he can make a powerful impression for good on thousands at the same time. The teacher must be able to convey, not simply knowledge, but his ideas. Not every well-bred man or woman can teach if they have the requisite knowledge. The effort of a community should be to get those who are adapted to teach into the school room,— and only those.— *New York School Journal.*

The most prominent defect in our present modes of instruction seems to be the imparting of knowledge that is a better preparation for a professional or mercantile career than for the sturdier life of a mechanic or farmer. Grammar, history, mathematics, and the languages are studied to the neglect of the physical sciences. These branches, particularly grammar, history, and the languages, are mainly ornamental. It is true they develop intelligence, and intelligence always works better than ignorance; but they are not the muscle that produces invention, or tills the soil. A knowledge of nature's laws rather than of men and speech is what the masses need.

OFFICIAL DEPARTMENT.

QUESTIONS AND ANSWERS.

DISTRICTS.

Q. Can a district be legally altered on a legal holiday?

A. No, the act of altering a district is *quasi* judical, can be appealed from. It requires previous notice to be given to the clerks of the districts to be affected, and they may decline to pay any attention to a notice calling a meeting on a holiday.

Q. If it is proposed to detach territory from a district in the town of A, and attach the same to a district joint between A and B, has the town board of B, any right to vote on the question of detachment?

A. It is not necessary to make this a separate question. The resolution acted on may be, that certain territory be detached from such a district in the town of A, and attached to such a district joint between A and B. The vote of the board of A, applies to both parts of the resolution; the vote of the board of B, applies only to the latter part. The law as it now reads (Sec. 418), contemplates this mode of procedure.

Q. Can the executive committee of a town board of directors act in altering a subdistrict?

A. It may be held that they can, under section 528, but the action is subject to review by the board.

2. Having voted that the district treasurer pay back the dog tax to those of whom it has been collected, can the district compel him to do it?

A. No, the district has no power to pass such a vote, and it would be unlawful for the treasurer to obey it.

Q. Is a district obliged to vote a salary to pay the clerk?

A. The provision is not compulsory. A district *may* do it.

TEACHERS.

Q. Can I make up one lost day, on Saturday, two of the board consenting?

A. The law does not recognize Saturday, as a school day. There is really no power on the part of the board to count a Saturday. (Sec. 459.)

Q. Must a teacher in a district joint between two counties report to both superintendents.

A. The superintendent who issues the certificate that is, the one in whose county the school house is located, has jurisdiction, and may require reports. If the other superintendent also wishes reports, it would be courtesy to make them.

Q. Can a teacher collect pay for time spent in attending examination for a certificate, after school begins, his old certificate running out?

A. No, if the certificate runs out, the contract runs out, until the teacher again becomes qualified. These things should be attended to before the school begins. If circumstances prevent, the necessity of losing time to get a new certificate, is like any other necessity for losing time, simply an inconvenience to both district and teacher.

MISCELLANEOUS.

Q. Is a treasurer obliged to pay an order which reads: Pay to A—— B——, $——, out of any money in your hands?

A. He should know for what it is to be paid. The order should specify this, and the fund out of which it is to be paid. If he pays an order loosely drawn not knowing what it is for, he does it at his risk.

Q. Can a parent dictate what text-books his child shall use, as well as select the studies to be pursued?

A. The power to determine what text-books shall be used is given exclusively to the board, under the advice of the State Superintendent.

Q. Must the census of school children in an independent city be taken exclusively by the city superintendent?

A. No, it is to be taken under the direction of the board, as provided in section 554.

THE object of education is rather to form a perfect character, than to qualify for any particular station or office.—*A. Potter.*

THOSE studies should be regarded as primary, that teach young persons to know what they are seeing, and to see what they would otherwise fail to see.

A TEACHER ought to know of everything much more than the learner can be expected to acquire. He must know things in a masterly way, curiously, nicely and in their reasons.—*E. Everett.*

SOME SHORT ARTICLES.

— It is a fact much to be deplored that the work in our elementary schools is largely chaotic. Each teacher so far as a plan of study is concerned is, like Alexander Selkirk, "monarch of all he surveys." As he enters the school he plans the work as best he can, and labors to bring about some systematic method, and at the end of the term has arrived to a basis upon which he can work. A new teacher succeeds him, who knows nothing of the work of his predecessor, there being no record of it left. A new system of work is at once adopted entirely different from that of the preceding teacher, or, perhaps his work is sort of a miscellaneous affair, having no system to it. Thus, each succeeding term brings about a change, defeating all efforts made toward any system in our elementary schools.

— The laws of health seem to be strangely neglected in our schools. One often learns more of sanitary science in a year's reading of newspapers than he did in ten years of schooling. Two years ago, at a meeting of the American Public Health Association, Professor E. W. Claypole, of Antioch College, suggested that sanitary science should be popularized in schools and colleges. He suggested that the reform should begin with the instructors, making them the centres of sanitary knowledge. "Sanitary teachers," was his maxim, "will in time produce sanitary schools."

— We have for a long time looked with envy on some features of the Pennsylvania school law. It has the Township System, superior systems of licensing teachers, county superintendents who have authority as well as responsibility, a state superintendent who practically holds a permanent office. We came home from Cumberland county with a confirmed opinion of the excellence of the Pennsylvania system, and with a higher opinion of the average excellence of Pennsylvania teachers. — *School Bulletin.*

— It is far from being true, in the progress of knowledge, that after every failure we must re-commence from the beginning. Every failure is a step to success; every detection of what is false, directs us towards what is true; every trial exhausts some tempting form of error. Not only so, but scarcely any attempt is entirely a failure; scarcely any theory, the result of steady thought, is altogether false; no tempting form of error is without some latent charm derived from truth.

CORRESPONDENCE.

EXAMINATIONS IN HISTORY.

[The following brief paper has been furnished by request, and appears here because the first form of this issue was already printed when it came to hand, and we do not like to keep it over.— EDS.]

A number of years ago there appeared in one of the English Quarterlies — I think the Edinburgh — some very discriminating biographies of American statesmen, among the rest of Gov. Clinton, in which their patriotism, honesty, and unselfishness were prominently noted. I read these with great pleasure, and felt that the general circulation of a volume of such would do much to counteract the poisonous effects of the indiscriminate slander now cast by partisans on all prominent candidates for public office. Our young people, gaining their knowledge of public men from the newspaper press alone, are led to conclude that all such are corrupt, and that success in public life is inconsistent with integrity — a very erroneous and corrupting idea.

The above recollections were brought to my mind by listening to an examination in U. S. History of the candidates for graduation in the River Falls Normal School, by Superintendent Whitford. His method was novel to me, and appeared very excellent. It was simple and efficient, and one which might afford suggestions to county superintendents, and others, in their examinations on this branch of study. The plan was to mention a name prominent in American history, and require a sketch of his character, and a statement of the important events in which he was an actor. Selecting a few such names, touching upon the leading points in our national life, afforded an excellent test of the candidate's knowledge, and an easy way of bringing it out.

It has seemed to me that there is room for a new text-book, based upon this idea. It would be historico-biographical, taking such names as would bring out a consecutive view of our history and progress, at the same time that it enlisted the interest of the students in the character of the individual, and prompted them to emulate his virtues. We might have, for instance, a series of chapters headed thus: Washington, and the causes of the Revolution; Jefferson, and the Constitution; Clinton, and Internal Commerce; Washington Irving, and American Literature; Franklin, and Science and Invention; Jackson, and the War of 1812; Daniel Webster, and State Rights; Lincoln, and the Rebellion; Grant, and our Military Resources; Hayes, and Civil Service Reform.

Such a work, in a popular style, by such a writer as Parton, thoroughly informed on the subject, and in full sympathy with it, could not fail to interest and instruct our youth, and lay the very best foundation for future historical acquisitions.

How much of English history that makes a lodgement in the general understanding, and of the patriotism that dwells in the hearts of the great body of the English people, clusters around the names of Alfred, the Great, William, the Conqueror, Richard, the Lion-Hearted, Milton, Shakespeare, Hampden, Crom-

well, and Sidney? What stirs the hearts of Scotchmen like the names of Wallace, and Bruce, and Burns, and Knox, and Chalmers?

He who prepares an acceptable work of this kind, fitted for our common schools, will certainly have a right to be called a public benefactor.

Pewaukee. A. F. N.

Should we write "Dells of the Wisconsin," or "Dalles?" The programme of the State Teachers' Association, as printed in the JOURNAL, has "Dells." One issued by the Secretary, has "Dalles." T.

"Dalle" is a French word signifying a "flag-stone," also, a "spout" for water. The "Dalles of the Columbia" is a term applied to a place on that river where the water rushes violently through a chasm, between steep walls of basaltic rock. We have also the "Dalles of the St. Louis," in Minnesota, near Duluth. In Wisconsin, our maps, histories, newspapers, etc., speak of the "Dells" of the Wisconsin and of the St. Croix. This is evidently a corrupt spelling, but almost universally prevalent in this State. By whom it was introduced, we know not. The late reports of the State Geologist spell the word correctly.

WILL you please explain "correction lines," and greatly oblige a subscriber? (See Nicodemus & Conover's Map of Wisconsin.) E. H.

In surveying a large body of land, there must be a meridian line — a north and south line — to measure from; also, base lines. In surveying Wisconsin, the "Fourth Principal Meridian" was extended from Illinois. It is coincident with the boundary between Grant and La Fayette counties. For a base line, the north line of Illinois was first used, as we suppose.

In laying off ranges of townships, east and west of the principal meridian, the surveyor would measure six miles on the meridian, and on the base, and thenceforth the townships would be nominally six miles square, but the boundary between the successive ranges would be a north and south line. Now, if the earth were a plane, ranges of townships starting with a width of just six miles, on the base line, would continue to be of that width, as far as the surveyor should go north; but the earth being a sphere, the lines as they run north will converge, each side of the principal meridian, and the width of the townships become less than six miles; and after the survey had been carried sixty miles north, it was deemed necessary to *correct* the diminution in width. The line upon which this was first done, is called the "First Correction Line," extending from the Mississippi, through the north part of Crawford county, the center of Richland, and so on east to Lake Michigan.

It will easily be seen, say by following this line west from the center of Richland county, that the townships north of that line, being now measured six miles wide again, are a little wider than those south, the difference, in the six ranges passed over before you reach the Mississippi, amounting in all, apparently, to more than one-third of a mile. Another series of similar off-sets will be seen by following the "Second Correction Line," from near the southeast corner of Jackson county to the Mississippi. After making the townships again

measure six miles, on this new base line, the convergence of the same in six ranges between the first and second correction lines, appears to have been about three-fourths of a mile. Some singular surveying seems to have been done in the northeast corner of Monroe, and the southwest corner of Jackson county, at this period.

This explanation is made after an examination of Nicodemus and Conover's Sectional Map of Wisconsin, and very likely needs correction itself, by a practical surveyor, and some further explanations.

How is Wisconsin really bounded? There was much controversy here lately about it? An Old Teacher.

Controversies often arise from confusion of ideas, or from the use of terms by different parties in different senses. Understanding by Wisconsin, a certain political division, it is bounded on its several sides by the political divisions which surround it: by British America, by Michigan, by Illinois, Iowa, and Minnesota. Consequently, the "enabling act" so called — an act of congress, found as an appendix to the revised statutes — which describes the boundaries of the State, begins at the northeast corner of Illinois, in the center of Lake Michigan; first pursues the boundary line of Michigan, passing through Lake Michigan, Green Bay, etc.; then goes through the center of Lake Superior, up the Saint Louis river, to some rapids; then due south to the Saint Croix; then down the Saint Croix and Mississippi, in the main channel, to the northwest corner of Illinois, and then east to the starting point. The act also provides that the State shall have concurrent jurisdiction on the Mississippi, and all other rivers and waters bordering on the State and forming a common boundary between it and other states.

It is evident, therefore, that the legal boundaries of the State, as a political division, are coincident with the legal boundaries of surrounding states, which boundaries happen to be mostly by the center of bodies of water, or in the mid-channel of rivers, and not on the land. But regarding Wisconsin as a name for a certain peninsular-like portion of land, and giving its boundaries as such, we may truthfully say, that, as North America is bounded on all sides by the waters which surround it, except on the short artificial line which separates it from South America, so Wisconsin is bounded on its various sides by certain waters, except on the artificial line of division between it and Illinois, and for short distances between it and Minnesota and Michigan.

In teaching geography, this distinction should be borne in mind, and the pupil made to understand it. In that way, confusion of ideas will be avoided.

Why are the eastern and western hemispheres divided as they are, on ordinary maps of the world, when the meridian of Greenwich is taken as zero in reckoning longitude? N.

The island of Hiero, or Ferro, the westernmost of the Canaries, was formerly regarded as the most western land of the eastern hemisphere, and its meridian taken as the base of longitude. Geographers in Germany, and some other coun-

tries, still reckon from that meridian, which is certainly more intelligible to the pupil in geography, and renders the matter of longitude more symmetrical. But, with England, we reckon from Greenwich, in general geography. Both the division of the hemispheres, and the selection of a prime meridian, are arbitrary.

A CONSTANT SUBSCRIBER TO THE JOURNAL, sending in her annual subscription, says:

MESSRS. WHITFORD AND PRADT: The writer's first school was taught in this place, over twenty-two years ago. I then registered sixty-two pupils, and for four months was paid $14 per month, out of which I boarded myself. My salary for the past five months has been $45 per month, and my register shows fifty names. I now commence my fifth term in ——.

Now, Messrs. Editors, don't you think I deserve to be pensioned, after having spent that many years in educating the youth?

Very respectfully, —— ——.

[We certainly think the writer has a claim upon the gratitude of the public, and hope the time is not far distant when teaching will become a settled profession, and that those who grow old in such service of the public will be rewarded as they ought to be. — EDRS.]

EDITORIAL.

WE PUBLISH in this number of the JOURNAL OF EDUCATION the address of Pres. Chapin, of Beloit College, which he presented last December before the Joint Session of the State Teachers' Association and the Academy of Sciences, Arts, and Letters. At the time of its delivery, it made a profound impression upon the members of both these bodies. It contains passages of rare eloquence. The treatment of the subject is candid, thoughtful, and convincing. It is a timely production, combatting the materialistic, skeptical, and unscientific tendencies of many students of physical science in these days. We trust that our readers will have the same pleasure in studying its paragraphs, that we enjoyed in first listening to them.

HEREAFTER no preparatory classes, except the second year of the classical course, will be organized in the State University. This will compel on an average from seventy-five to one hundred students to fit themselves yearly in our high schools and academies, for entrance into this institution. The movement is judicious and desirable. It takes largely from the University an element very difficult to bring into harmony and assimilation with the other classes. It throws back in some degree upon our secondary schools the responsibility of sustaining the high school instruction in this state. It must tend to unite the University and the other colleges of the state more closely with the upper departments of our public schools.

THE PROJECT of establishing in the State University a department in which its students intending to teach in our public schools may be instructed in the theory and art of their calling, seems likely to end in a failure. At the late meeting of the Regents of this institution, the following resolution was adopted:

That the Executive Committee, in conjunction with the President of the University, be authorized to negotiate with the Board of Regents of Normal Schools, respecting the erection of a chair of Didactics, and to make necessary arrangements therefor, providing that this shall involve no expense to the University.

THE REGENTS of the Normal Schools cannot be expected to maintain such a chair in the State University. They have not the means. With an annual income, smaller than that received by the University, they now have to support four schools in the state, conducted by fifty-nine teachers, and attended by nearly nineteen hundred pupils. Besides, they are compelled to meet five-sevenths of the expenses incurred yearly in holding over sixty institutes in the counties of the state. By the act of the Legislature last winter, they will be required to open and maintain, as soon as practicable, a fifth normal school in Milwaukee. These facts must be known to the authorities of the State University. The above resolution must then be understood, under the circumstances, as a movement which does not heartily accept the proposition to es ablish a chair of Didactics in the highest institution of the state, and which postpones it indefinitely or for years to come. In this action, Wisconsin does not take an equal step with some adjoining states, in preparing the graduates of its University to become the most competent teachers in its high schools, and to assume the highest supervision of the public schools of the cities and counties.

NEW PUBLICATIONS.

FIRST LESSONS IN NATURAL HISTORY AND LANGUAGE. New York: Harper and Brothers.

This little book, just published, is new in plan and method, and we think it to be a work well suited to primary and grammar schools. It furnishes matter both entertaining and instructive, just when such matter is most needed, and happily carries out the idea of teaching something useful to the young pupil in in connection with the study of language. We like the book very much.

A HISTORY OF ROME. By R. F. Leighton, Ph. D. (Lips.), New York: Clark & Maynard. 554 pp. 12 mo.

This handsome volume is one of the excellent manuals known as Anderson's Historical Series, and adds much to its value. Within the last quarter of a century much material has accumulated, throwing additional light upon Roman history, of which Dr. Leighton has happily availed himself. Schools, seminaries, or private readers, in pursuit of a compendious outline of the history of the Roman people, will do well to examine this book, and will, we think, find it

well adapted to meet their wants. It is fully illustrated with maps, plans, and engravings.

THE DOMESTIC MONTHLY FOR JULY does not indicate that fashion has either settled upon simplicity or turned her attention to styles of dress which will take the same rank as a fine picture or a poem; but it is enough to expect of fashion at midsummer that styles shall be becoming, and not altogether opposed to the rules of art, and that they shall not represent the burdens of elegance. It is "the fashion" at present to simplify all toilets in a measure; fewer pieces are thought essential to the whole costume, and for midsummer this is certainly an advantage. In the literary department are three stories, namely: an installment of Mr. Conway's "Bertine." "A Beautiful Girl, by Esther Searle Kenneth, and "Norah," bp Lucy Marion Blinn. Mary Ainge de Vere, and Mrs. Merrighi contribute each a poem, and there is a sketch of the Théâtre Français, and its organization apropos of the colored frontispiece. Eben E. Rexford contributes a timely paper on "The Garden in Midsummer," and the announcement is made of the successful competitors for the prizes offered in the June number. The *Domestic Monthly* is published by Blake & Company, corner Broadway and 14th Street, New York, at $1.50 per year, inclusive of pattern premium. Specimen copies 15 cents.

THE NORTH AMERICAN REVIEW has an able article, in its July issue, on Bismarck. The Chancellor of the German Empire is unquestionably the most astute politician of our time. But he differs in one important particular from the current type of the European diplomatist. The Metternichs, Gortschakoffs, Beusts, *et id omne genus*, with all their imitators, big and little, look on diplomacy as a sort of legerdemain, or, perhaps we should better say, as a game of cards, where the player must under no circumstances "show his hand." The diplomat must use language to *conceal* his thoughts, and he must never commit himself to anything. But Prince Bismarck has repeatedly proclaimed his purposes in advance with the greatest candor. As for his fellow diplomatists of other governments, they have never yet grown accustomed to the great Chancellor's frankness, and still persist in reading only between the lines of his manifestoes. The reader who is curious to obtain an inside view of Prince Bismarck's character as the genius of Statecraft, will find much to interest him in this paper, which is contributed by the Chancellor's Boswell, Moritz Busch, and entitled "Bismarck as a Friend of America, and as a Statesman." Other articles in the same number of the *Review* are, "Canada and the United States," by Prof. Goldwin Smith; "The Exodus of Israel," by President S. C. Bartlett,— a defense of the Pentateuchal account in the light of modern research; "The English House of Lords," by J. E. Thorold Rogers, M. P.; "The Ethics of Sex," by Miss M. A. Hardaker,— a calm, philosophical study of the woman question; "The Panama Canal," by Count de Lesseps; and "Profligacy in Fiction," by A. K. Fiske. The *Review* can be obtained of book sellers.

WE have received from Messrs. VanAntwerp, Bragg & Co., a beautifully printed set of McGuffey's Revised Readers, Harper's Elementary Grammar and Composition, and Peaslee's Graded Selections for Memorizing.

HISTORICAL DEPARTMENT.

THE MONTH AT HOME.

— Congress adjourned, June 16, with the usual amount of unfinished business. Owing to the nearness of the next Presidential election, both parties have been almost wholly occupied in fence; and no measure of any historical importance has been enacted — unless it be the Ute bill, which is designed to carry into effect the agreement entered into last winter by Secretary Schurz and Chief Ouray.

— The National Conventions have done their work, and the candidates are before the people —

GARFIELD and ARTHUR, Republican;
HANCOCK and ENGLISH, Democratic;
WEAVER and CHAMBERS, Greenback;
NEAL DOW and THOMPSON, Prohibitionist.

— The four candidates for the Presidency were all officers in the Union army, ranking from Colonel to Major General.

— The tenth census is well under way, and some of the figures are already announced, though revision is yet to be made. New York shows about 1,208,000; Philadelphia, 842,000; Brooklyn, 550,000; Boston, 352,000; Chicago, 477,000. St. Louis is very unhappy at being left behind by Chicago to the tune of about 90,000. Milwaukee reports 130,000; Racine, 16,500. Milwaukee steps ahead of Detroit and Louisville.

— The Soldiers' Reunion at Milwaukee, June 7–11, and the June floods in central and western Wisconsin, may be accounted as not unimportant events.

The crowd at Milwaukee during the Reunion was doubtless the largest gathering ever held in the country, aside from the Centennial at Philadelphia.

Less pleasant was the great accumulation of water along the Chippewa, Wisconsin, and Upper Mississippi. Great destruction of property and business was wrought at Eau Claire, Chippewa Falls, and elsewhere.

— The national debt was reduced $16,000,000 during the month of May.

THE MONTH ABROAD.

— What shall be done with Turkey? is the European question of the day. Its ruler seems to be more perversely headstrong, its treasury more hopelessly bankrupt, and its general moral odor more offensive than ever before.

At the instance of the new English Cabinet, a conference of the Great Powers has recently met, with purpose of securing the enforcement of the Treaty of Berlin. This conference supported the claim of Greece to a considerable extension of its boundaries northward.

When Greece recovered her independence, in 1830, she had an unmistakable right to the whole of ancient Thessaly and Epirus, but the jealousy of the Great

Powers deprived her of this, and left it in the hands of "the unspeakable Turk." During the Russian war of 1877–8, Greece made ready to seize this territory by force of arms, but was restrained by England. At the Berlin Congress in 1878, she was betrayed and snubbed by Disraeli, but finally was recognized as entitled to an accession of territory from Turkey. The Sultan, by the characteristic Turkish policy of delay, has thus far avoided the fulfillment of his treaty obligations. The accession now confirmed to Greece will increase her area by nearly one-third, and her revenue by one-half. Whether Turkey will even now acceed, without coërcion, remains to be seen.

—The French Chamber of Deputies has passed an act granting general amnesty to political offenders. The measure is for the especial relief of the communists exiled eight years ago. It is somewhat doubtful how the Senate will vote on the bill. The Jesuits are leaving the country, as their day of grace expired June 30th.

—The English Parliament and nation have been greatly exercised over the case of Mr. Bradlaugh, the noted atheist, who refused to make the usual oath on taking his seat in the House of Commons. The conservatives rallied a majority on a motion that he be allowed neither to take the oath nor affirm, an action which virtually excluded him from his seat. It is probable that he will yet be allowed to affirm.

—The Chilians have proved wholly victorious in their war against Peru, and are exacting terms of peace grievously severe.

—A rebellion has broken out in the Argentine Republic, on the heel of a Presidential election. The candidate supported by the city and province of Buenos Ayers was defeated by the vote of the interior provinces, whereupon the unsuccessful party organized an insurrection.

THE U. S. JUDICIARY.

—The editor of this department is the recipient of so many inquiries, by letter and otherwise, in regard to the judiciary system of the United States that he hopes to meet some of them in advance, by a brief article on the subject.

The national courts proper are as follows, viz.:

1. The U. S. Supreme Court,
2. Nine U. S. Circuit Courts,
3. Fifty-eight U. S. District Courts,
4. The U. S. Court of Claims,
5. The Supreme Court of the District Columbia.

Attached to this system, though not forming a part of it, are the Territorial Courts, Supreme and District.

The U. S. Supreme Court, since 1870, is composed of a Chief Justice, and eight Associate Justices. It sits only in the city of Washington, and is greatly overloaded with work, so that cases before it must often wait two or three years for trial.

Next below this are the circuit courts, which are a somewhat flexible affair. As the name implies, the sessions of a circuit court are not all held in one place,

but at various places within the circuit. There are four places in Wisconsin where the U. S. Circuit Court may sit. They were originally held by justices of the U. S. Supreme Court, each of whom is allotted to one of the nine circuits; but an act of Congress, in 1869, provided for each circuit a circuit judge, having the same powers and jurisdiction as the supreme court justices, in their respective circuits. The member of the supreme court allotted to any circuit is known as the "circuit *justice*," in distinction from the "circuit *judge*." Circuit courts may now be held by either the circuit justice, the circuit judge, a district judge, or any two district judges sitting together. Usually they are held by the circuit judge, the circuit justice sitting with him in very important cases.

The States of Indiana, Illinois, and Wisconsin constitute the seventh judicial circuit of the U. S. The circuit judge is Thomas Drummond, of Chicago. The circuit justice is John M. Harlan, of Kentucky, the last-appointed member of the supreme court.

The district courts form the bottom, or foundation, of the system. There are fifty-eight districts, but only fifty-three district judges, one judge attending to two or three districts in some of the Southern States; as Alabama, which comprises three districts under one judge. Each district, however, has its U. S. District Attorney, Marshal, and Clerk.

In Wisconsin are two U. S. Judicial Districts, the Eastern, under Chas. E. Dyer, of Racine, and the Western, under Judge Romanzo E. Bunn, of Madison. In the Eastern District, sessions are held at Milwaukee and Oshkosh; in the Western, at Madison and La Crosse.

The salaries of U. S. Judges are as follows:

Chief Justice of the Supreme Court, $10,500 *per annum;* Associate Justices, $10,000 each; Circuit Judges, $6,000; Judges of the Court of Claims, $4,500; Judges of the Supreme Court of District of Columbia, $4,000 (Chief Justice, $4,500); District Judges, $3,500 to $5,000, mostly the smaller figure.

U. S. Judges are appointed by the President and Senate, to hold office "during good behavior," which is practicrlly for life; as they are removable only by impeachment. Any U. S Judge having held his commission ten years, and being seventy years of age, may resign his office, and still receive the full salary during life.

The Supreme Court of each organized Territory consists of a Chief Justice and two Associates, with a salary of $2,600 each. Territorial judges are appointed by the President and Senate, and hold office for four years, unless sooner removed.

INSTITUTE WORK IN U. S. HISTORY AND GOVERNMENT, 1880.

Teachers wishing to make thorough preparation for the history work in the fall institutes, may find it difficult to get at the desired information without considerable loss of time in search and selection. For the assistance of all such, I have undertaken to furnish a sort of key, or directory, to the most helpful authorities on the various topics to be considered.

In the early history of our own country there are really but two great topics, or questions, and these are not independent of each other. 1. *How came this*

nation to be an English speaking one? That is, how is it that the English language, social customs, institutions, ideas of government and religion and education, etc., have predominated rather than those of any other nation? In order to answer this it becomes necessary to ask what other nations attempted in any degree to do that which England succeeded in doing; when, where, how, and to what extent, they made entrance into this continent.

On this part of the work, the subject of national claims in North America, I know of no author who presents a clear and well arranged account. The raw material for the work, however, may be found in quite copious amount in Ridpath's Histories, especially his largest book. Those who have access to Bryant's History, will find in chapters VI to XIII, of Vol. I, full and interesting matter. Especial attention is called to chapters XXI and XXIII of Vol. II, the former treating of the French settlement of the Mississippi valley, and the latter of the Spanish explorations of New Mexico and California. Chapters I to IX, of Parkman's "Pioneers of France in the New World," furnish an unrivalled account of early Spanish and French operations.

I should not advise, however, the reading of these elaborate and fascinating narratives as the first step. It seems better to first work out a concise and connected outline—a tabular view, perhaps—from some familiar text-book. Swinton's is best for this purpose. The skeleton of the subject having thus been set up, let it be clothed upon by as full a reading of Bryant, Parkman, or even Ridpath, as circumstances will allow. The atlas or map should always be in sight during the reading.

The rival nations having been fairly started in the race for possession, we pass directly to consider the outcome, the way in which each claim was extinguished or eliminated. First comes the Spanish seizure of French Carolina, and next the English seizure of New Netherlands (the colony of New Sweden cannot be accounted a national claim). The French and Indian war and the Louisiana Purchase, dispose of the French claim, while the Spanish is closed out by the Florida Purchase and the Mexican Revolution of 1821. This last needs no extended consideration; a mere notice of the fact will suffice.

On the Spanish and French in Carolina, nothing is equal to Parkman's vividly graphic story (first nine chapters of "Pioneers of France in the New World"). On the dispossession of the Dutch, see Chap. XI, and last part of Chap. XIV, Bryant's Vol. II.

The French and Indian War in its consequences, direct and indirect, forms perhaps the most important turning point in our history. Study the war solely for its results. For this, read, first of all, the closing pages (pp. 456–62) of Bancroft's Vol. IV.

Ridpath strikes the key-note briefly, "Popular" Hist., p. 279,—"Academic" Hist., p. 243. The last chapter of Parkman's "Old Regime in Canada," will also be found suggestive in this connection.

On the Louisiana Purchase, consult Anderson's "Popular" Hist., U. S., p. 196–8, and map facing p. 243; Ridpath's "Popular" Hist., p. 378–9, "Academic" Hist., p. 337–8. Also an article in this journal for May, 1880, by the writer hereof.

The second great question is: *How came the government of this nation to be a federal republic?*

For a concise account of forms of government in general, see chapter IV of Martin's Civil Government. On colonial governments under the English, consult Townsend's Analysis of Civil Govt., chapter V, and Swinton's U. S. Hist., pp. 84–7. For the fullest and best account of the governmental history of each colony, see Part II of Martin's Civil Govt.

The last general topic of the syllabus, "The Growth of the Idea of Union, or Centralization," is somewhat difficult of investigation, but none the less an exceedingly important subject. On this point, nothing is so instructive as Frothingham's "Rise of the Republic of the United States." Those who can get access to it will be amply repaid for working up the following references.

On the prominence of the idea of local self-government in the original *status* of the colonies, read pages 13 to 28. On the New England Confederacy of 1643, Chap. II. On the attempt of James II to consolidate the colonies, pp. 78 to 84. On the various Plans of Union previous to Franklin's, pp. 110 to 119. Franklin's plan, pp. 141 to 150. On the effect of George III's policy, pp. 158 ff. and p. 29.

In continuation of these studies, much profit may be derived from an article in the *North American Review* of December, 1879, entitled "The Permanence of Political Forces," and from that admirable little manual, "The History of American Politics," by Alexander Johnston. No teacher or student of our history can make a better investment than to send 75 cents for it to Henry Holt & Co., New York. Only its first chapter, however, bears directly upon the syllabus of this year.

A. S.

NOTES.

LAST YEAR $181,270.64 was apportioned by the State Superintendent, on the basis of 477,028 children reported, and at the rate of 38 cents for each child. The gain in the school fund income distributed this year is $11,276,96, and in the rate two cents per child.

THE PEOPLE of Dist. No. 8, Otter Creek, Eau Claire county, have been again unfortunate. Their school-house was destroyed by lightning June 2, about seven P. M. It was just eleven months since a school-house on the same ground was demolished by a wind storm.

SUPT. MAHONEY, in a recent number of the *Kenosha Telegraph*, says: "We believe that the compulsory school law has had the effect of bringing two hundred children to the schools of this county, who were never before at school. School boards, keep the ball rolling."

THE REPUBLICAN CANDIDATES for President and Vice-President were both teachers in the common schools. In 1851 C. A. Arthur taught a district school at North Pownal, Vt., and in 1852 James A. Garfield taught the same school. Both had the same object in view — to earn a little ready money.

C. L. POWERS, who has taught, as principal, for several years in the graded schools, at Two Rivers and Hartford, has left school room work, and assumed the position as one of the editors and publishers of the West Bend *Times*. At the reunion last month at Milwaukee, he was chosen the secretary of the permanent organization of the 37th Regt. of Wis. Vol. Inf.

WM. E. COLE, of Fond du Lac, writes: "Regarding the excursion of teachers and students to Colorado, as near as I am able to judge at the present time, not a sufficient number will go to make up a special train. I think, however, that quite a good many will take the trip, but will have to go by regular trains. The round trip rate from Madison will be $65.15; tickets good till the 31st of October."

A CHAIR OF AGRICULTURE was temporarily erected by the Regents of the University at

their last meeting, and W. A. Henry chosen Professor of Agriculture. Prof. E. A. Birge, of the chair of Zoology, was granted leave of absence for one year, Mr. John Murdock serving as his substitute. A chair of Music was created, and F. A. Parker chosen to fill it. Miss Flora Dodge was appointed tutor to assist Prof. Owen, in French. C. R. Vanhise and Magnus Swenson were awarded tutorships to assist Prof. Daniells in Chemistry.

SUPT. GROGAN, of Sheboygan county, sends this item:

"About ninety per cent. of the teachers who taught in our schools the past winter attended the Institute, and I think its influence was felt in the increased efficiency of the schools. I make a note of institute attendance on each certificate, and I notice that many district officers show a decided preference for those teachers who are willing to devote at least two weeks in each year to special preparation for their work."

THE WHOLE number of children of school age returned from districts maintaining school five or more months, for the year ending August 31st, 1879, was 481,369. Dividing the total income by this number of children gives forty cents as the sum to be apportioned for each child, with the remainder of $3,191.71, to meet corrections which may hereafter be made by the school-districts in respect to the number of children reported.

THE use of the possessive neuter pronoun *its* in the poems which Chatterton wrote and palmed off as the productions of one Rowlie, a monk in the fifteenth century, betrayed the forgery, inasmuch as that little monosyllable *its*, now so common and convenient, did not finds its way into the language till about the time of Shakespeare. Milton never once uses it, nor, except as a misprint, is it to be found anywhere in the Bible.

AT A MEETING of the Board of Trustees of the Deaf and Dumb Institute held on the 8th of last month, Prof. John W. Swiler, formerly of the Illinois Institute at Jacksonville, was elected Superintendent in place of Prof. W. H. DeMotte. The present corps of teachers was retained for the ensuing year. Prof. De Motte remains during the summer vacation, supervising the erection of the new buildings, which are expected to be ready for the use of the school in September.

STATE SUPERINTENDENT VON COELLN, of Iowa, has decided, In re Hilson vs. Independent District of Richland Center, Chickasaw county, that a school-teacher cannot be discharged without a fair hearing, including the hearing of all witnesses and the privilege of cross-examination. Pending such an investigation, which must be had before a full board, the teacher may be suspended, but not discharged. The teacher has a right to be represented by an attorney, and the proceedings of the board must be recorded.

MISS AGNES HOSFORD, superintendent of Eau Claire county, writes under date of June 8th:

"I have visited more than half of the country schools, and have been much gratified to find the teachers, almost without exception, attempting to carry out the methods suggested at the Institute this spring. Some are practicing Grube's method in arithmetic with encouraging success; others are meeting with marked success in teaching reading by phonic analysis. The teachers generally are paying more attention to primary instruction than during any previous term, and are making corresponding improvement in this part of the work."

AN INTELLIGENT CORRESPONDENT of the *Herald and Presbyter*, published at Cincinnati, Ohio, writes as follows in respect to prospects of the northern section of our State:

"It has been my good fortune to see something of the northern portion of this State during my vacations, and I see, without doubt, that its vast prairies, immense forests of hard wood lumber, its mines of iron and copper, and its water power, equal to the best of New England, must in time create a commonwealth equal to the most prosperous in our republic."

THE STATE SUPERINTENDENT has received from the Secretary of State the following report, under date of June 5, 1880:

"In accordance with the provisions of section 260 of the Revised Statutes, I hereby certify that the interest accruing and found due on all the certificates of indebtedness belonging to the school fund up to and including the 31st day of May, 1880, is $109,389; which amount of interest I have placed to the credit of the school fund income. I further certify that the balance in the State Treasury, on the 31st day of May, 1880, belonging to the school fund income, and received from other sources, was $86,350.31, making a total of $195,739.31, on the 31st day of May, 1880, to be apportioned by you among the several counties, towns, villages, and cities, under the provisions of section 554 of the Revised Statutes."

THE BRODHEAD *Independent* says: "It is doubtful whether Prof. Richmond will accept the principalship of our schools unanimously tendered him by the board some two weeks ago. He is well pleased with the school and with his work here, but for some years it has been his purpose to pursue his own studies at some higher institution, as soon as circumstances should permit. Somewhat sooner than he anticipated, the "convenient season" appears to have come, and he now thinks of reading law in an office during vacation, and of entering some institution in the fall. We

do not understand, however, that his decision is absolutely irrevocable, and we are not without hope that his valuable services may be secured for our schools for another year."

PRESIDENT HAYES attended on the 24th ult. the commencement exercises of Kenyon College, Ohio; and in a brief address to the students of that institution made the following remarks in respect to the advantages of the smaller colleges:

"The student of a small college who has diligently and thoroughly mastered the studies of his course, will surely find that he is at no disadvantage as compared with the greatest of what are known as the great colleges in the training element, knowledge, habits of thought and study, which are requisite for success in the professions or in any field of learning or service which he may choose to enter. There are compensations in little colleges for the well-known advantages of larger institutions. I do not discourage the great colleges. I know by the comparison of results. I merely say to you, as students of one of the small colleges, you need not dread more than others the competitions by which in practical life merits are discovered and determined."

THE MEMPHIS *Avalanche* thus speaks of the last year's work of the principal of the Le Moyne Normal School, of that city: "Prof. Steele, through the kindness of publishers, and other scanty resources, has gathered at the Le Moyne a very choice library of several hundred volumes, which is free to the use of all our citizens. He has also, this season, for the benefit of our colored citizens generally, maintained a course of free lectures, delivered by our leading thinkers on practical topics, which has been very successful. This course ought to be, and, the *Avalanche* predicts, will prove the precursor of courses of lectures for the benefit of all our citizens. Prof. Steele is a gentleman of superior ability and rare culture, who is devoted to doing good; and the *Avalanche* takes pleasure in commending the noble work of himself and his worthy assistants."

THE *Free Press* says: "The spring term of the Reedsburg school closed last Friday, and, for the pleasure of the scholars, the teachers interested themselves in having a picnic in the park in the afternoon, at which strawberries and cream were served. Of course this was a matter of great enjoyment to the scholars, and a goodly number of the parents added interest to the occasion by their presence and participation in the afternoon festivities. For the teachers we may say, that they can congratulate themselves on having done their full duty to their scholars, as we have heard only words of commendation for each and all of them. The school has been ably conducted by the principal, Prof. J. H. Boyle, assisted by an able corps of teachers, as follows: Miss Mary Neeley, principal's assistant; Miss Nellie Neeley, intermediate; Miss Alice Green, second primary; Miss Hannah Weinzierl, first primary."

HERETOFORE, the incidental expenses of occupants of Ladies' Hall have been assessed at $32 each year, but this being found altogether too small, and the building an increasing burden to the University fund, it was decided by the Regents, at a late meeting, to make the assessment for the next collegiate year the sum of $50, to be paid as follows: $20 for the fall term, $15 for the winter term, and $15 for the spring term. Board and washing are additional. This sum is quite low enough, for it includes room-rent, care of rooms, baths, fuel and light, and the use of the great building in all its various departments. Even at $50 per year, the buildings will have to be filled to completion — 60 students and 10 lady officials — to make it pay expenses; not being filled, however, the Regents anticipate Ladies' Hall will cost them $1,000 over and above its income, the coming year. Including board, but excluding washing — which is charged for at the rate of 60 cents per dozen — the young ladies, under the new regime will pay $164 per year, or $4.31 per week, for 38 weeks of schooling.

LET US now take a view of the extraordinary rise and progress of the higher education in this country. Let us take first the growth of collegiate institutions. Prior to the last forty years there were very few colleges, and those almost exclusively in the eastern States. But since then the increased sense of the necessity of education, the great increase of surplus wealth in the hands of Christian people, and the great and liberal grants of land by the government, have greatly and rapidly increased the number and quality of colleges. Dividing the ninety years since 1790 into three periods, we see the establishment of colleges as follows:

	Colleges.
Established prior to 1790	14
Established from 1790 to 1820	13
Established from 1820 to 1850	80
Established from 1850 to 1880	251

A glance at this table shows how very recent, and yet how great has been the advance in collegiate education. The year 1840 may be taken as the beginning of the advance. Out of 358 colleges now existing, nearly 300 have come into existence the last forty years. A superficial observer might be apt to say that this advance of students and the quality of education were not as great as the advance

in the number of colleges. This would be only superficial, for the increase of students is even more in proportion to that of colleges, for not only have many of the new colleges a large number of students, but the oldest and best colleges have more than doubled their numbers. Harvard, Yale, and Princeton have doubled their numbers and doubled the means of instruction.

JUDGE NAPTON, of the Supreme Court of Missouri, delivered last month, in behalf of all the members of this court, the following decision, which covers also an important point in the school law of Wisconsin:

"The only question in this case is, whether rule 11, adopted and enforced by the board of the Jefferson City school-district, in the case of the plaintiff's son, is a legal one.

"The question arose on a demurrer to defendant's answer, which set up a breach of this rule by plaintiff's son as a justification for his suspension. The circuit court sustained the demurrer.

"The rule 11 is as follows:

"'Any pupil absent six half days in four consecutive weeks, without satisfactory excuse, shall be suspended from school.' The statute provides that the 'board shall have the power to make all needful rules and regulations for the organization, grading, and government of the school in their district.' It is clear that the legislature has entrusted to the school board the duty of making regulations touching the government of the school, of the necessity and propriety of which they are primarily the judges. They are elected by the people of the district, and must be presumed to be conversant with the subject, and have no motive to make any rules except such as in their best judgment are necessary and proper to promote the objects of our common school system. That the judiciary might intervene in case of rules, manifestly reaching beyond their sphere of action, and relating to subjects nowise connected with the management or successful operation of the school, was decided by this court in Dritt vs. Snodgrass, 66 Mo. R., 286, and that the courts might interfere also in case where the rule was calculated to subvert or retard the leading object of our legislation on the subject, may be conceded. But I apprehend that the case should be a plain one.

"It is said that occasional absences from school on the part of the pupil, or "truancy," as it is familiarly termed, if of no importance to any one except the pupil or his parents, and its indulgence is, therefore, not to be attended with such punishment as suspension or expulsion from school entirely — that every child has a right to go to the public school, and that right cannot be taken away by a rule of the board; that such a rule is subversive of the object of our system of common schools, which was designed to throw open the door of the school to all children of the proper age, and give them an opportunity of acquiring such education as will fit them for the after duties of life. This is true; but this right of attending school necessarily requires, when the school is joined, and whilst such attendance continues, a submission to the regulations of the school. Suppose rule 11 to be inverted, and instead of reading as it now stands, should read thus: "Any pupil is at liberty to go fishing during school hours, and be absent a half day or a whole day and as many days as he pleases, provided he conducts himself decently when in attendance on school." And this is the point to which the argument of the plaintiff tends. The pupil, it is urged, is at liberty to be absent when he pleases, and such absence is a matter solely between him and his parents. But the studies in our public schools are, I presume, classified according to the ages and advancement of the scholars, and the continued and repeated absence of one of the class is not only injurious to the absentee, but, if allowed beyond a certain point, is calculated to demoralize those who attend, and derange the orderly instructions of the teacher.

"Taxes are not collected to pay teachers to sit in front of empty benches, or for pursuing truant pupils. Such absences, when without excuse, are the fault of the parents, whose business it is to see that the attendance of their child is regular, unless prevented by causes which will, of course, be an excuse under the rule now in question.

"My opinion is that the rule in question was clearly within the power of the Board of Trustees, and that it is not our business to supervise its expediency, even if we might differ with the Board on that point; but all the judges are of the opinion that the rule was a reasonable and proper one. The judgment will therefore be reversed and the case remanded.

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